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by VIERHAPPER.[12] It is assumed at the outset that a group whose members have in common such striking characters must be monophyletic. The morphology is confined to the grosser taxonomic characters (but includes the structure of the wood), excluding entirely the gametophytic structures, because the new system is based upon facts, and the gametophytes are not yet known in all the genera, and presumably are not yet worthy of recognition among the established facts. The obvious characters are analyzed and classified as primitive and secondary.

The Cordaitinae are the primitive stock, which during the Carboniferous gave rise to the Coniferae, the Taxocupressaceae arising as an offshoot from Ginkgoinae, and the Abietaceae coming directly from the Cordaitinae. The Taxocupressaceae include the Taxoideae and Taxodioideae arising independently from the *Ginkgo* stock during the Carboniferous, and the Cupressoideae arising during the Trias from the Taxodioideae. The Abietaceae include the Araucarioideae coming directly from the *Cordaites* stock, and the Cunninghamioideae and Abietoideae arising from the araucarian stock during the Trias.

Without commenting upon the scheme itself, it would seem to the reviewer that so much is now known about the gametophytes, and that so much of this comparatively recent knowledge is extremely significant, that it must be considered in any classification which claims to represent the phylogeny of a group.—CHARLES J. CHAMBERLAIN.

Cretaceous pine leaves.—In the communication cited the authors describe the anatomy of a species of *Pinus* and a supposed species of *Prepinus*, from the Upper Cretaceous of Hokkaido, Japan.[13] The pine leaf, denoted by the specific name *P. yezoensis*, from the description given is not very different in structure from the living *P. Bungeana* of China, since it is a soft pine with a single foliar bundle and apparently a three-leaved fascicle. In type it clearly differs from the pine leaves of the Lower Cretaceous described by the reviewer, in possessing a degenerate transfusion sheath, a well-marked endodermis, and infolded mesophyll cells. In other words, it is practically indistinguishable in its general structure from the leaf of a living pine. Interestingly enough, in a communication from the reviewer's laboratory, shortly to appear, it will be shown that the wood of a pine from the American Upper Cretaceous likewise resembles more nearly the secondary xylem of living pines than that of pines from the Lower Cretaceous. It will thus apparently be possible to distinguish between these two horizons by means of the nature of the pine flora. The *Prepinus* described, *P. japonicus* (why not *P. japonica?*), apparently does not belong to that genus at all, since it is without the very striking internal transfusion sheath of the lower cretaceous genus, has a double instead of a single foliar bundle (a point of great importance, as will be recognized by those versed in the anatomy of *Pinus* in its living species), and no centripetal xylem. The authors make light of the absence of the last feature, but in this they are apparently not well advised.—E. C. JEFFREY.

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[12] VIERHAPPER, F., Entwurf eines neuen Systemes der Coniferen. Abhandl. K. K. Zool.-Bot. Gesell. Wien **5**:1–56. 1910.

[13] STOPES, MARIE C., and KERSHAW, E. M., The anatomy of cretaceous pine leaves. Annals of Botany **24**:395–402. *pls. 27, 28.* 1910.

Conduction of stimulus.—ROTHERT has shown that the conduction of stimulus of unilateral illumination from the tip of the *Avena* seedling to the darkened basal portion occurs when the vascular strands are cut; and that a horizontal incision on one side, whether toward, away, or on the flank in reference to the one-sided illumination, still permits conduction. FITTING showed that when the incision was away from the light and a mica plate inserted, no conduction occurred. The insertion of a slice of rattan in the same position did not prevent conduction; the latter of course allows the continuity of water and solution. When the mica plate was inserted in an incision on the lighted side, conduction was not hindered. JENSEN[14] finds that with the incision away from the light, no conduction occurs in dry air or in water. He assumes that under favorable conditions the stimulus can be conducted across the wound while under unfavorable conditions it cannot. In saturated air the stimulus was also conducted from the tip to the darkened base, even after the tip (1 cm. long) had been entirely cut off and set back and fastened by gelatin and cocoa butter.—WILLIAM CROCKER.

Embryo sac of Pandanus.—In 1909 CAMPBELL published an account of the embryo sac of *Pandanus*, which was reviewed in this journal (**47**:485, 1909). In this Javanese material the fertilization stage was not secured, so that it was not certain that the interesting situation described is the one at fertilization. Now there has come to hand additional material (*P. coronatus*) which has supplied the missing stage.[15] An ordinary egg apparatus is organized, but there occurs "a large discoidal mass of cells" at the antipodal end of the sac, and fusions of "polar" nuclei (up to six) were observed. The number of cells in the sac at the fertilization stage would thus seem to be greater than that recorded for any other angiosperm. The amount of antipodal tissue suggests the situation in *Sparganium*, the difference being that in the latter genus this tissue develops after fertilization.—J. M. C.

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[14] JENSEN, P. BOYSEN, Ueber die Leitung des phototropischen Reizes in Avenakumpflanzen. Ber. Bot. Gesell. **28**:118–120. 1910.

[15] CAMPBELL, DOUGLAS H., The embryo sac of *Pandanus coronatus*. Bull. Torr. Bot. Club **24**:293–295. *figs. 6.* 1910.